

## FORAGE SUITABILITY GROUP VERY DROUGHTY LOAM

**FSG No.:** G063BY130SD

**Major Land Resource Area:** 63B - Southern Rolling Pierre Shale Plains

### Physiographic Features

These soils are found on upland slopes and terraces.

	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	1300	2000
<b>Slope (percent):</b>	0	9
<b>Flooding:</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Ponding:</b>		
<b>Depth (inches):</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Runoff Class:</b>	Low	Very high

### Climatic Features

This group occurs in a mid-continental climate characterized by wide seasonal temperature and precipitation fluctuations and extremes.

Annual precipitation varies widely from year to year in MLRA 63B. Average annual precipitation for all climate stations listed below is about 22 inches. About 76 percent of the annual precipitation occurs during the months of April through September. On average, there are about 29 days with greater than .1 inches of precipitation during that same timeframe. Precipitation is less than needed for optimum forage production and is the single largest factor limiting production from this group on non-irrigated lands.

Average annual snowfall ranges from 19 inches at Creighton, Nebraska (NE,) to 44 inches at Winner, South Dakota (SD). Snow cover at depths greater than 1 inch range from 4 days at Stephan, SD, to 57 days at Winner.

Average July temperatures across the MLRA are about 76<sup>0</sup>F and average January temperatures are about 17<sup>0</sup>F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -37 and a high of 114 both recorded at Kennebec, SD. The MLRA lies in USDA Plant Hardiness Zones 4b and 5a.

The climate data listed in the tables below represent high and low ranges and averages for the climate stations and dates listed. For additional climate data, access the National Water and Climate Center at <http://www.wcc.nrcs.usda.gov>.

	<b>From</b>	<b>To</b>
<b>Freeze-free period (28 deg) (days):</b> (9 years in 10 at least)	128	152
<b>Last Killing Freeze in Spring (28 deg):</b> (1 year in 10 later than)	May 20	May 08
<b>Last Frost in Spring (32 deg):</b> (1 year in 10 later than)	Jun 09	May 17
<b>First Frost in Fall (32 deg):</b> (1 year in 10 earlier than)	Sep 01	Sep 21
<b>First Killing Freeze in Fall (28 deg):</b> (1 year in 10 earlier than)	Sep 19	Sep 30
<b>Length of Growing Season (32 deg) (days):</b> (9 years in 10 at least)	92	131
<b>Growing Degree Days (40 deg):</b>	4526	5505
<b>Growing Degree Days (50 deg):</b>	2652	3257

	From	To
Annual Minimum Temperature:	-25	-15
Mean annual precipitation (inches):	18	25

### Monthly precipitation (inches) and temperature (F):

2 years in 10:	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
Precip. Less Than	0.06	0.09	0.27	0.66	1.18	1.80	1.24	0.73	0.65	0.55	0.12	0.13
Precip. More Than	0.54	1.24	2.70	3.97	5.70	5.65	4.96	3.94	4.34	2.64	1.49	0.85
Monthly Average:	0.41	0.55	1.56	2.36	3.34	3.54	3.08	2.45	2.13	1.45	0.77	0.56
Temp. Min.	1.3	7.5	18.2	31.1	42.2	52.3	58.2	55.5	44.9	32.8	18.9	6.1
Temp. Max.	32.4	38.6	48.5	62.8	74.0	84.0	91.1	88.9	78.7	66.0	47.7	35.2
Temp. Avg.	18.7	24.4	34.9	48.5	59.6	69.5	75.7	73.5	63.2	51.1	35.2	22.4

<u>Climate Station</u>	<u>Location</u>	<u>From</u>	<u>To</u>
NE1990	Creighton, NE	1961	1990
NE1365	Butte, NE	1961	1990
SD9367	Winner, SD	1961	1990
SD0778	Bonesteel, SD	1961	1990
SD3452	Gregory, SD	1961	1990
SD7992	Stephan, SD	1961	1990
SD4516	Kennebec, SD	1961	1990

### Soil Interpretations

This group consists mostly of well drained, moderately deep, moderately coarse textured soils that formed in loamy materials over clay residuum from clayey shales. A few are moderately deep over sand and gravel. Available water holding capacity is low.

<b>Drainage Class:</b>	Well drained	To	Excessively drained
<b>Permeability Class:</b>	Moderate	To	Very slow
(0 - 40 inches)			
<b>Frost Action Class:</b>	Low	To	Moderate

	<u>Minimum</u>	<u>Maximum</u>
<b>Depth:</b>	20	
<b>Surface Fragments &gt;3" (% Cover):</b>	0	3
<b>Organic Matter (percent):</b>	1.0	4.0
(surface layer)		
<b>Electrical Conductivity (mmhos/cm):</b>	0	2
(0 - 24 inches)		
<b>Sodium Absorption Ratio:</b>	0	0
(0 - 12 inches)		
<b>Soil Reaction (1:1) Water (pH):</b>	5.1	7.3
(0 - 12 inches)		
<b>Available Water Capacity (inches):</b>	3	5
(0 - 60 inches)		
<b>Calcium Carbonate Equivalent (percent):</b>	0	5
(0 - 12 inches)		

### Adapted Species List

The following forage species are considered adapted to grow on the soils in this group. Additional information concerning plant characteristics of a number of the listed species as well as individual cultivars of many of those species can be accessed on the web at <http://plants.usda.gov/>.

<u>Cool Season Grasses</u>	<u>Dryland</u>	<u>Irrigated</u>
Crested wheatgrass	G	NS
Green needlegrass	G	NS
Intermediate wheatgrass	F	G
Meadow brome	F	G
Orchardgrass	NS	G
Pubescent wheatgrass	G	G
Russian wildrye	G	NS
Smooth brome	F	G
Western wheatgrass	G	NS

<u>Warm Season Grasses</u>	<u>Dryland</u>	<u>Irrigated</u>
Big bluestem	F	G
Indiangrass	NS	G
Little bluestem	G	NS
Sideoats grama	G	NS
Switchgrass	NS	G

<u>Legumes</u>	<u>Dryland</u>	<u>Irrigated</u>
Alfalfa	G	G
Birdsfoot trefoil	NS	G
Cicer milkvetch	G	F
Purple prairieclover	G	NS
Red clover	NS	G
White prairieclover	F	NS

G - Good adaptation for forage production on this group of soils in this MLRA

F - Fair adaptation but will not produce at its highest potential

NS - Species is not adapted to the site and should not be planted

### Production Estimates

Production estimates listed here should only be used for making general management recommendations. Onsite production information should always be used for making detailed planning and management recommendations.

The high forage production estimates listed below are based on dense, vigorous stands of climatically adapted, superior performing cultivars. They are properly fertilized for high yields and pest infestations are kept below economic thresholds. Mechanical harvests are managed to maintain stand life by cutting at appropriate stages of maturity and harvest intervals. If grazed, optimum beginning and ending grazing heights are adhered to. Adequate time is allowed for plant recovery before entering winter dormancy under both uses.

The production estimates listed below represent total annual above ground plant production on an air-dry-matter basis. Estimates of hay and grazing yields can be calculated from these numbers by multiplying them by a harvest efficiency. A 70 percent harvest efficiency is commonly used when converting to hay yields. Pasture harvest efficiency is highly dependent on the grazing management system applied, ranging from 25 to 50 percent.

	Management Intensity		Management Intensity	
	<u>High</u> (lbs/ac)	<u>Low</u> (lbs/ac)	<u>High</u> (lbs/ac)	<u>Low</u> (lbs/ac)
Alfalfa	4300	2300		
Alfalfa/Intermediate wheatgrass	3400	2000	14300	7700
Alfalfa/Smooth brome grass	3400	2000	14300	7700
Intermediate wheatgrass	2900	1400	11400	6300
Smooth brome grass	2900	1400	11400	6300

## Forage Growth Curves

Growth curves estimate the seasonal distribution of growth of the various forage crops. They indicate when the forages may be available for grazing or mechanical harvest.

**Growth Curve Number:** SD0001  
**Growth Curve Name:** Alfalfa  
**Growth Curve Description:** Alfalfa, MLRA's 107, 102B, 63B, 66, 65

Percent Production by Month											
<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	5	30	25	20	15	5	0	0	0

**Growth Curve Number:** SD0004  
**Growth Curve Name:** Cool season grass  
**Growth Curve Description:** Cool season grass, statewide

Percent Production by Month											
<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	10	40	30	10	5	5	0	0	0

**Growth Curve Number:** SD0005  
**Growth Curve Name:** Warm season grass  
**Growth Curve Description:** Warm season grass, statewide

Percent Production by Month											
<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	0	10	40	35	15	0	0	0	0

**Growth Curve Number:** SD0003  
**Growth Curve Name:** Irrigated Alfalfa  
**Growth Curve Description:** Irrigated Alfalfa, statewide

Percent Production by Month											
<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	5	25	25	20	15	10	0	0	0

## Soil Limitations

The primary limitation for these soils is their moderate depth to bedrock or sand and gravel and resulting low available water capacity which limits species selection and production potential. On steeper slopes, water erosion is a potential problem during establishment, when renovating stands, and in thin established stands. Livestock trail erosion is a potential problem on established stands. Also, wind erosion is a potential problem during stand establishment.

## Management Interpretations

Selecting forage species that are highly tolerant to periods of drought and inadequate soil moisture can reduce the impact on yields of the low available water capacity of these soils. Including sod forming grass species in stands, especially on steeper slopes, will reduce the potential for sheet and rill erosion. Incorporate both wind and water erosion control practices during the establishment period. Properly locating facilitating practices such as fences, lanes, and water developments can help control livestock movement, reduce trailing perpendicular to steeper slopes, and evenly distribute grazing pressure.

## **FSG Documentation**

### **Similar FSG's:**

#### **FSG ID**

G063BY120S

#### **FSG Narrative**

Droughty Loam soils have higher available water capacity and greater production potential.

## **Inventory Data References**

Agriculture Handbook 296-Land Resource Regions and Major Land Resource Areas  
Natural Resources Conservation Service (NRCS) National Water and Climate Center data  
USDA Plant Hardiness Zone Maps  
National Soil Survey Information System (NASIS) for soil surveys in South Dakota and Nebraska counties in MLRA 63B  
South Dakota and Nebraska NRCS Field Office Technical Guides  
NRCS National Range and Pasture Handbook  
Various South Dakota and Nebraska Agricultural Research Service, Cooperative Extension Service, and NRCS research trials for plant adaptation and production

## **State Correlation**

This site has been correlated with the following states: Nebraska and South Dakota

## **Forage Suitability Group Approval**

**Original Author:** Tim Nordquist

**Original Date:** 4/3/02

**Approval by:** Dave Schmidt

**Approval Date:**